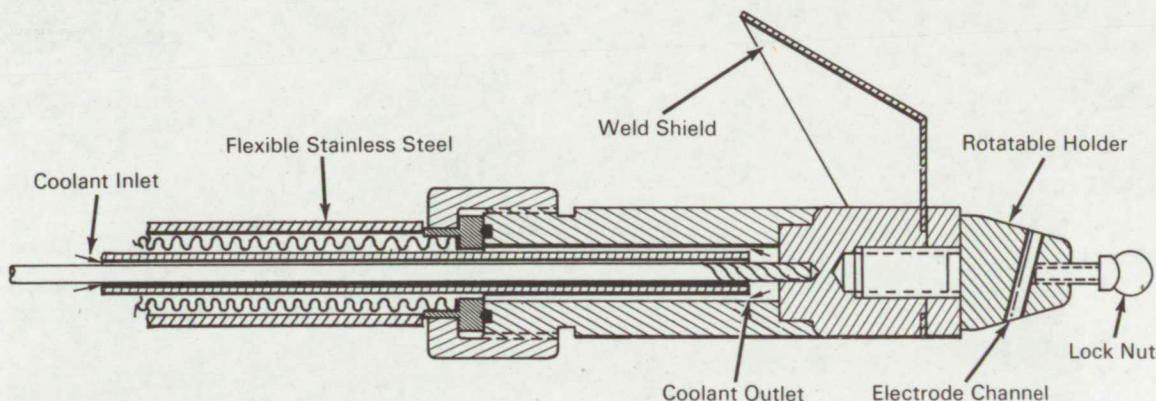


NASA TECH BRIEF



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Improved Torch Increases Weld Quality in Refractory Metals



The problem:

In welding some of the newer materials that are being used structurally in aerospace applications, commercially available manual welding torches have been found to contribute undesirable contamination to the weld atmosphere. Alloys of such metals as zirconium, titanium, columbium, and tantalum are ideally welded in a vacuum purged, inert gas back-filled welding chamber (weld box). Tooling, or the coatings and finishes of items to be used in such a weld box must contribute a very minimum to atmosphere contamination by outgassing or because of their permeability.

The solution:

A specially designed welding torch made up of tooling that is essentially impermeable so that practically zero contamination results from its use in the weld box.

How it's done:

As shown, the torch proper consists of an electrode holder, lock nut, and torch body. The torch body includes a center bored copper rod having the welding

cable brazed into one end. A flexible stainless steel hose surrounds the cable and carries cooling water to the electrode holder. The electrode holder and lock nut arrangement permits radial movement of the electrode without breaking the coolant connection or subjecting the cable to torsional strain. This feature reduces operator fatigue, an important factor in glove box work. Also included in the torch design is a radiation shield to protect the operator's hands when welding at high amperages.

Notes:

1. Maximum flexibility is obtained by providing all transmission functions (current conductor and insulation plus coolant inlet and outlet) in a single minimum diameter unit.
2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B68-10041

(continued overleaf)

Patent status:

No patent action is contemplated by NASA.

Source: G. G. Lessman and R. Sprecace
of Westinghouse Electric Corporation
under contract to
Lewis Research Center
(LEW-324)